PATENT

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APPLN. NO:	08/839,161	*EXAMINER:*	C. Cohen
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TITLE:	SUPPORT SYSTEM FOR LATERALLY REMOVABLE SASH		

APPEAL BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231

Attention: Board of Patent Appeals and Interferences

Dear Sir:

The Notice of Appeal was filed at the Patent Office on 18 February 2000.

1. Real Party in Interest

This application is assigned to Caldwell Manufacturing Company, a New York State corporation.

2. Related Appeals and Interferences

None.

3. Status of Claims

Claims 1-25 and 29-90 are rejected, and rejection of all these pending claims is appealed. Claims 26-28 have been withdrawn.

4. Status of Amendments

All amendments have been entered, and no unentered amendments are involved. A copy of the claims as amended is enclosed.

5. Summary of Invention

The invention improves on the counterbalancing of an especially heavy sash that is laterally removable, as explained in the Background section on the first page of the specification. The exceptional weight of the sash and the corresponding strength of the counterbalance system affect several components that must be made strong and rugged to endure the forces involved. Aspects of the invention also contribute to the necessary convenience required in the two-man job of removing and replacing a heavy sash.

The basic operation of the invention is illustrated in FIGS. 1-3; and the essential components involved are described in the Summary of the Invention from page 1, line 28, to page 2, line 19. The strength required for these components is preferably achieved by metal extrusions forming sash shoes 30, sash support arms 20, and shoe-locking hooks 45. The importance of metal extrusions for these elements is explained at page 2, lines 20-35.

The lateral removal and replacement of a heavy sash, as illustrated in FIGS. 1-3, is explained generally from page 3, line 23, to the bottom of page 4. The lateral space needed for removal and reinsertion of a sash 10 in between sash shoes 30 is bridged by pivotally mounted support arms 20, which are described from page 5, line 6, to page 6, line 2, and are illustrated in FIGS. 1-5, 9, and 10. The pivotal mounting of support arms 20 allows them to hang freely downward where they are out of the way while a heavy sash is maneuvered laterally out of or into a supported position in a window.

The freely pivoted sash support arms also automatically engage support platforms of sash shoes 30 and slide outward to the positions required for upholding a sash on shoes 30. To perform these functions for a heavy sash, the support arms are preferably formed of metal extrusions.

The specification section devoted to counterbalance shoes 30, from page 6, line 4, to page 7, line 19, explains the preferred shoe configuration facilitating inexpensive extrusion of strong and durable shoes having hook-shaped upper regions to connect with counterbalance elements and L-shaped platform regions to support a sash 10 via sash support arms 20. The sash arm ends 27 resting the sash weight on platforms 37 position this weight directly below the hook-shaped upper region where a counterbalance lifting force is exerted. This ensures absence of any moment arms tending to turn sash shoes 30 around horizontal axes; and in turn, this reduces friction as sash shoes move vertically while subject to a heavy sash load and a correspondingly strong counterbalance lifting force. If these two are not vertically aligned, as explained, the sash shoes tend to bind and rub in the window jambs.

Sash guide blocks 35 and their mounting grooves are explained at page 6, lines 16-30. Sash shoes and guide blocks are illustrated in FIGS. 1-8, and guide blocks 35 are independently illustrated in FIGS. 11 and 12.

Shoe-locking hooks 45 and the preferred jamb lances 47, affording strong and secure locking of sash shoes 30, are explained from page 7, line 20, to page 8, line 20, and illustrated in FIGS. 1-8. Hooks 45 are latched into undeployed positions and unlatched for deployment to engage lances 47 as explained in this section; and because of the counterbalance lifting forces involved, locking hooks 45 are also preferably formed of metal extrusions.

The claims on appeal, which appear in the appendix to this brief, cover various combinations of the illustrated and described features. All of these are directed to the strength, durability, security, convenience, and inexpensiveness required for dealing with an especially heavy sash.

6. Issues

1. Whether claims 1-11, 29, 30, 32-34, 39-44, 46-48, 53-58, 60-63, and 67-73 are unpatentable under 35 USC 102(b) as being anticipated by Haas Patent No. 2,796,630.

2. Whether claims 74, 75, 79-81, 85, 86, and 90 are unpatentable under 35 USC 102(b) as being anticipated by Osten, Sr. Patent No. 2,987,758.

3. Whether claims 76, 77, 78, 82-84, and 87-89 are unpatentable under 35 USC 102(b) as being anticipated by or under 103(a) as being obvious over Osten.

4. Whether claims 31, 49-51, and 64-66 are unpatentable under 35 USC 102(b) as being anticipated by or under 103(a) as being obvious over Haas.

5. Whether claims 12-25 are unpatentable under 35 USC 103(a) as being obvious over Osten.

6. Whether claims 35-38 and 45 are unpatentable under 35 USC 103(a) as being obvious over Haas as applied to claims 1-11, 29, 30, 32-34, 39-44, 46-48 and 61-63, 53-58, 60, 67-73, and in further view of Osten.

7. Whether claims 59 and 72 are unpatentable under 35 USC 103(a) as being obvious over Osten.

8. Whether claim 52 is unpatentable under 35 USC 103(a) as being obvious over Haas as applied to claims 31, 49-51, and 64-66.

7. Grouping of Claims

The claims in the different groups of claims as rejected do not stand or fall as a group.

8. Argument

1. Whether claims 1-11, 29, 30, 32-34, 39-44, 46-48, 53-58, 60-63, and 67-73 are unpatentable under 35 USC 102(b) as being anticipated by Haas Patent No. 2,796,630.

Claims 1-11 define a pair of sash support arms mounted to hang freely downward on opposite sides of a sash and to pivot from downwardly hanging positions to outwardly extending positions that the support arms assume when supporting a sash. The final rejection cites sash support arms 152 of Haas as hanging freely downward, but this is incorrect. Haas support arms 152 do not hang freely downward and do not pivot from downwardly hanging positions to outwardly extended positions. They slide horizontally like a door latch and are biased horizontally outward by springs 164 (see FIG. 2). Haas support arms 152 are not mounted for any sort of pivotable motion. They are spring biased constantly outward, but are never oriented downward. "Downward" is a clearly understood direction in the context of counterbalanced window sash that move up and down in a window; and the Haas support arms that slide

laterally and horizontally, are not pivoted, and do not hang downward so that they fail to anticipate claims 1-11.

Claims 1-11 also require, in paragraph 1.b., that the downwardly hanging positions of the support arm are disposed so that as the sash is lowered toward a supported position, the downwardly hanging arms engage supporting platforms of counterbalanced sash shoes so that sash lowering engagement between the arms and the platforms pivots the arms outward along the platforms. Haas support arms 152 do not meet any of these limitations. Haas support arms 152 are not downwardly hanging, do not engage sash shoes while hanging downward, and do not move outward in response to engagement between the arms and the platforms. The Haas arms also are not pivoted and, instead of moving outward in response to sash-lowering engagement with sash shoes, are biased constantly outward by compression springs 164.

Claims 1-11 also require, as set out in paragraph c of claim 1, that outer end regions of the sash support arms resting on sash platform regions spaced from the sash are arranged vertically under counterbalance elements connected to the shoes to support the weight of the sash. The Haas support arms 152 also do not meet this requirement, because they engage regions of sash shoes that are laterally offset from counterbalance elements, rather than being vertically under counterbalance elements.

Claims 2 and 3 are not anticipated by Haas for the further reason that they require inner regions of sash-supporting platforms to engage the sash support arms in downward hanging positions and outer regions of the platforms to engage outer end regions of the sash support arms in outwardly extended positions. The Haas support arms 152, being biased outward by compression springs 164, engage shoe platforms in only one region. They do not engage shoe platforms in one region when hanging downward (which the Haas arms do not do) and in another region when the arms are outwardly extended, because the Haas support arms are always outwardly extended, unless moving upward from underneath the sash shoes.

Claims 4-6 are not anticipated by Haas for the additional reason that they require jamb projections to which shoes are locked (claim 4). Haas does not suggest any jamb projections engaged by locks and discloses only smooth walled jambs. The locks 92 of Haas bite into a plane wall of the jamb and do not interlock with the claimed jamb projections.

Claims 7-11 are not anticipated by Haas for the further reason that the Haas shoes and sash support arms are not formed of metal extrusions having evenly extending profiles. The Haas shoes 66, for example, are formed of sheet metal plates.

Claims 29, 30, and 32-34 are not anticipated by Haas for several reasons. They require, in paragraph a of claim 29, a sash shoe formed of a metal extrusion having a predetermined, evenly extending profile establishing an elevational configuration of the shoe. The Haas shoe or locking carrier 64 is not formed as an extrusion, but instead is formed of a sheet metal plate 66.

Paragraph b of **claim 29** further requires that the elevational configuration of the metal extrusion extends integrally downwardly from an upper region of the shoe formed in a hook shape to interconnect with a counterbalance to a lower region of the shoe formed as a platform to support a sash. Haas does not suggest a hook-shaped upper region of an extruded shoe, but instead suggests a hole punched in a sheet metal plate to receive a hook end of a counterbalance spring. Haas also does not suggest an integral extrusion of a shoe forming a sash support platform. The lower portion of the Haas sheet metal plate 66 includes a horizontal bar 72 that is not a sash support platform, but does support a pivotably mounted lock-tripping lever 112 that supports a sash. Lever 112 is not integral with the shoe as claimed and is not formed as an extrusion as claimed.

Paragraph c of **claim 29** further requires that the shoe have a width established by a predetermined length of an extrusion. Haas does not teach different widths of shoes or that a width of a shoe be established by a predetermined length of an extrusion giving the shoe an elevational profile.

Claim 30 is not anticipated by Haas for the additional reason that it requires a locking hook mounted on the shoe and deployable to an operative position in which the hook hangs downward from the shoe. The Haas locking element is angled upward from the shoe and spring biased toward a horizontal position, but it is not hook-shaped and never hangs downward from the shoe.

Claims 32-34 are not anticipated by Haas for the additional reason that they require a spring latch for retaining the locking hook in an inoperative position. Haas lacks any suggestion for holding lock 92 in an inoperative position. To the contrary, the Haas spring 102 biases lock 92 constantly toward locking engagement, and lock 92 is never latched out of locking engagement by a spring latch.

Claims 39-44 and 46-48 define a shoe and a sash support arm, each of which is formed of a metal extrusion having an evenly extending profile establishing an elevational configuration. The shoe extrusion integrally forms a hook-shaped upper region engaging a counterbalance and a platform-shaped lower region supporting a sash, and the integrally extruded sash support arm is pivotally connected to a stile of the sash to engage a sash-supporting region of the shoe.

Haas does not anticipate these features. Haas does not suggest extrusion of either shoes or sash support arms, and Haas discloses shoes and sash support arms that are not extruded and not configured for extrusion. Haas' shoe is also not integral because its sash support platform is a separate element assembled onto a sheet metal plate. The Haas shoe also does not have a hook-shaped upper region and instead Haas suggests a hole 62 punched in a sheet metal plate to connect to a counterbalance spring. Instead of an integral extrusion forming a shoe with a platform-shaped sash-supporting region, Haas suggests a sash-supporting platform formed as a lock-tripping lever 112 pivotally mounted on a pin 110 assembled onto a sheet metal lock carrier 64.

As for sash support arms, Haas suggests a fluid bore or socket 162 formed transversely of an elevational configuration of an arm that slides horizontally within a range permitted by projection 148

(see FIG. 2). Sash support arm 152 has a configuration that is not extrudable because of spring socket 162. Arm 152 also is not pivotally connected to a stile of a sash, but slides horizontally back and forth within a pocket formed in a sash.

Claim 40 distinguishes from Haas for the additional reason that Haas does not suggest a shoe lock having an extruded elevational configuration. The Haas lock 192 is U-shaped and has a transverse pin hole so that its form is not extrudable.

Claim 41 distinguishes from Haas for the additional reason that Haas does not suggest an extruded shoe profile configured to form a groove receiving a pivot pin supporting a shoe lock. Haas suggests a pivoted shoe lock, but its pivot is held in a hole punched or drilled in plate 66.

Claim 42 distinguishes from Haas for the additional reason that Haas does not suggest a resilient latch mounted on the shoe to retain a shoe lock in an undeployed position. The shoe lock that Haas suggests is constantly biased downward toward deployment, is never latched out of deployment, and is only held from deployment by non-resilient lock-tripping lever 112 on which sash support arm 152 rests.

Claim 43 distinguishes from Haas for the additional reason that it claims a manually latchable and unlatchable shoe lock. The lock suggested by Haas is not latchable and operates automatically so that it is neither manually latchable nor manually unlatchable.

Claim 44 distinguishes from Haas for the additional reason that the claimed shoe lock is downwardly dependent from the shoe in its deployed position. The Haas lock 92 is never downwardly dependent from the shoe and instead is upwardly angled from the shoe both when locked and unlocked.

Claim 46 distinguishes from Haas for the additional reason of claiming an extruded elevational configuration of a mid-region of a shoe formed with a locking slot for receiving a resin guide. The Haas

shoe has guide pins 82 and 84, but neither of these is arranged in an extruded locking slot as claimed.

Claims 47 and 48 distinguish from Haas for the additional reason that the Haas support arm 152 is not pivotally mounted on a sash stile as claimed and does not move to a downwardly hanging position assumed when not supporting the sash. The Haas plunger 152 is horizontally disposed at all times and moves only inward and outward in a horizontal direction.

Claims 53-58 and 60 define sash support arms that hang downward in dependent positions when not supporting a sash and move outward to braced positions in response to engagement of the support arms with locked sash shoes as the sash is lowered between the shoes so that the weight of the lowered sash urges the sash support arms outward on the shoes to the braced positions. The Haas sash support arms 152 do not anticipate these requirements. The Haas arms 152 do not hang downward in dependent positions at any time, since they are horizontally disposed at all times. The Haas support arms move outward under the bias of springs 164 and do not move outward in response to engagement of the sash support arms with locked sash shoes as the sash is lowered as claimed. The only thing that moves the Haas support arms outward is the springs they contain, and the sash support arms are not moved outward on locked sash shoes to braced positions as the sash is lowered as claimed.

Claims 53-58 and 60 further distinguish from Haas by the requirement that the sash support arms in the braced positions have end regions resting on sash shoes in support regions vertically under upper shoe regions where counterbalance elements are connected to the sash shoes. Haas suggests that support arms 152 be offset from the counterbalance springs biasing the shoes upward, rather than being arranged vertically under a region where counterbalance elements connect to sash shoes. In fact, arms 152 of Haas are on the opposite side of a jamb wall 45 from the counterbalance connection to the sash shoe at hole 62.

Claims 61-63 claim a shoe locking system that locks sash shoes in window jambs while a sash supported on the shoes is

removed. It requires that the shoes have locking hooks that move between latched and unlatched positions and hang dependently downward from the shoes in unlatched positions where as the shoes rise, the hooks engage the jambs under lances formed in the jambs. When the hooks are in latched positions, they are retained out of engagement with the jambs and clear of the lances.

Haas does not anticipate these requirements. Haas does not suggest shoe locks formed as hooks, does not suggest jambs formed with lances to engage shoe-locking hooks, does not suggest shoe locks that hang dependently from shoes in unlatched positions or shoe locks that are held in latched positions out of engagement with lances in jambs. The Haas locks 92 engage only smooth jamb walls, are constantly biased into locking engagement, are always inclined upward, are never latched out of locking engagement, and do not have any interlocking engagement with lances formed in jambs.

Claims 67-73 cover a system of supporting a sash that is laterally removable from between opposed window jambs. These claims require sash support arms pivotally mounted on sash stiles to hang downward so that lower ends of the support arms engage sash end regions of shoe platforms when the sash and its support arms are moved downward from above the shoe platforms. The Haas sash support arms 152 do not meet this requirement, because they are not pivotally mounted on sash stiles and do not hang downward as a sash is lowered. They only slide in and out horizontally.

Claims 67-73 further distinguish from Haas by requiring that downwardly hanging sash support arms move to outwardly extended positions as the weight of a downwardly moved sash transfers to the shoes via the sash support arms. The Haas sash support arms 152 are biased outward by springs 164 and are not moved outward from downwardly hanging positions as sash weight transfers to the shoes via the support arms. The Haas sash support arms move inward, only if they move upward from below the sash shoes; and they are otherwise urged horizontally to their outermost position by springs 164.

Claims 67-73 further distinguish from Haas by requiring a counterbalance lifting force on the shoes to be vertically above the jamb end regions of the shoe platforms that are engaged by the sash support arms in the outwardly extending positions. The Haas sash support arms 152 engage shoe platforms in only one position, and the Haas counterbalance springs are not vertically above the region where the Haas sash support arms engage the shoes.

Claim 68 further distinguishes from Haas for the additional reason that Haas does not suggest shoe platforms configured with steps that sash support arms slide downward over as the arms move from sash end regions to jamb end regions of the shoe platforms.

Claim 69 distinguishes from Haas for the additional reason that the Haas sash support arms are not braced against pivotally moving beyond downward hanging positions and outward extending positions.

Claims 70-72 distinguish from Haas for the additional reason that Haas does not suggest extruded sash support arms and instead suggests sash support arms with blind bores that are not extrudable. Haas also does not suggest sash support arms of different lengths (claim 71) or that different lengths of sash support arms be extruded with coding lines (claim 72).

Claim 73 distinguishes from Haas for the additional reason that Haas does not suggest sash shoes formed of metal extrusions. Instead, Haas suggests that sash shoes be formed of sheet metal plates 66.

2. Whether claims 74, 75, 79-81, 85, 86, and 90 are unpatentable under 35 USC 102(b) as being anticipated by Osten, Sr. Patent No. 2,987,758.

Claims 74, 75, and 79 define a sash counterbalancing system using sash support arms that transfer the weight of a sash

to shoes at support regions vertically below counterbalanced lifting regions to minimize any moment arms tending to turn the shoes around horizontal axes. These claims also require that the support arms move to downwardly hanging positions upon movement of the sash upward and laterally from the shoes.

Osten does not anticipate these features. The Osten sash support arms 50 engage pivotally mounted locking plates 92 in regions of the plates that are vertically offset from counterbalance springs. Plates 92, when bearing sash weight, in turn engage shoe surfaces 118 in regions offset from counterbalance spring force. This arrangement gives locking plates 92 a deliberate moment arm tending to turn plates 92 around a horizontal axis. This is to bias locking edge 98 out of engagement with a jamb when locking plate 92 is loaded with sash weight and to use the force of the counterbalance spring to bias locking edge 98 into locking engagement with a window jamb when sash weight is removed from locking plate 92 (see FIG. 4). The deliberate moment arm applied to locking plate 92 by the vertical offset between sash weight and counterbalance spring also applies a moment arm around a horizontal axis to the shoe supporting locking plate 92.

Osten sash support arms 50 are constantly biased outward by springs 56 and move downward only when the bias of springs 56 is overcome. The Osten sash support arms do not move to downwardly hanging positions upon removal of the sash support arms from locking plates 92, because springs 56 always urge the sash support arms outward.

Claim 75 further distinguishes from Osten for the additional reason that the Osten sash support arms do not hang downward when not transferring sash weight to shoes. Springs 56 prevent the Osten sash support arms from hanging downward.

Claim 79 further distinguishes from Osten for the additional reason that the Osten sash lock 92 does not constitute a sash platform engaging support arms hanging downward from a sash being lowered onto the shoes. Osten suggests only sash support regions engaged by sash support arms in positions that bear sash weight.

Claims 80, 81, and 85 define a counterbalance system for a laterally removable sash that requires counterbalance shoes to be biased upward at lifting regions arranged vertically above support regions for sash arms to minimize any moment arms tending to turn the shoes around horizontal axes. These claims also require that the support arms move in response to lifting the sash upwardly of the shoes in a region between the counterbalances when the sash is lifted to remove its weight from the support regions. This automatically facilitates laterally removing the sash without the support arms being in the way.

The Osten patent does not suggest these features. The region of its locking plates 92 engaged by sash support arms 50 is deliberately offset vertically from counterbalance lifting springs so as to pivot locking plates 92 for locking purposes. This also applies a moment arm to the shoes pivotally mounting locking plates 92, by the offset engagement of locking plates 92 with shoe surfaces 118.

The Osten sash support arms 50 are biased outward by compression springs 56 so that arms 50 do not move as claimed in response to lifting the sash upwardly of the shoes. Arms 50 remain spring biased outward when lifted from locking plates 92, and the only movement of Osten sash support arms inward is if the sash is positioned with sash support arms 50 below locking plates 92, as shown in FIG. 2, so that arms 50 are cammed inward as a sash is lifted above locking plates 92. Any such inward movement of Osten support arms 50 is not in response to lifting a sash upwardly of the shoes as claimed.

Claim 81 further distinguishes from Osten for the additional reason that the Osten sash support arms do not move in response to being subjected or not subjected to sash weight. Instead, they are constantly biased outward by springs 56.

Claim 85 further distinguishes from Osten for the additional reason that the Osten sash support arms do not move inwardly toward the sash when the sash is lifted from the shoes. Under such sash-lifting circumstances, the Osten sash support arms remain spring biased to their outward positions.

Claims 86 and 90 define a support system for a laterally removable sash that includes sash support arms that hang downward from the sash stiles when the sash is uplifted. These claims also require that counterbalance lifting regions for the shoes are arranged vertically above support regions that uphold the weight of the sash transferred via the support arms to the shoes so that the sash weight does not subject the shoes to moment arms tending to turn the sash shoes about horizontal axes.

The Osten reference does not anticipate these features. The Osten sash support arms 50 are constantly biased outward by compression springs and do not hang downward from the sash stiles as claimed. The counterbalance lifting regions for the Osten shoes are not arranged vertically above sash support regions as claimed, and the Osten locking plates and shoes carrying the locking plates are both made subject to moment arms tending to turn the locking plates and the supporting shoes about horizontal axes. Subjecting the shoes to moment arms, as Osten teaches, fails to achieve the advantages of the claimed invention in reducing friction as the shoes move vertically in their shoe channels while supporting the weight of a sash.

3. Whether claims 76, 77, 78, 82-84, and 87-89 are unpatentable under 35 USC 102(b) as being anticipated by or under 103(a) as being obvious over Osten.

Claims 76-78 require that shoes (claim 76) and sash support arms (claim 77) are formed of a metal extrusion having an evenly extending profile. Osten suggests extrusion only for window jambs and does not suggest extrusion for either sash shoes or sash support arms. Osten's sash shoes do not have a profile that can be evenly extended in an extrusion to form a shoe. The Osten shoes require recesses transverse to any such extrusion and are not configured to be extrudable. The Osten sash support arms are configured with blind bores to receive compression springs 56, and the blind bores

are transverse to a profile of the support arms so that these also are not configured to be extrudable. No person of ordinary skill in the art upon reading the Osten disclosure at face value would receive from Osten any suggestion for forming sash shoes or support arms as extrusions as claimed.

Claims 78, 82-84, and 87-89 further distinguish from Osten for the additional reason that Osten does not suggest support arms of different lengths and has no need for support arms of different lengths. The Osten window is not designed to accommodate varying distances between sash stiles and sash shoes so that a person of ordinary skill in the art reading the Osten disclosure at face value would receive no suggestion for using sash support arms of different lengths and no suggestion for using extrusions to form sash support arms of different lengths.

4. Whether claims 31, 49-51, and 64-66 are unpatentable under 35 USC 102(b) as being anticipated by or under 103(a) as being obvious over Haas.

Claim 31 requires that a locking hook be formed of a metal extrusion having an evenly extending profile. Haas does not anticipate this, because Haas does not suggest a lock shaped as a hook and does not suggest extrusion as a way of forming shoe lock 92. Furthermore, lock 92 requires a U-shape with a transverse bore to receive pin 90 and perpendicular transverse bores to receive the ends of bias spring 102. Such a configuration is not extrudable in any profile orientation, and a person of ordinary skill in the art upon reading the Haas disclosure would receive no suggestion for extruding shoe lock 92, forming a shoe lock as a hook, or devising an evenly extending extruded profile that could function as a shoe lock.

Claims 49 and 50 require that a shoe be available in different widths established by different predetermined lengths of an extrusion to accommodate different widths of shoe jamb

channels. Haas does not anticipate this and, to the contrary, suggests that shoe 64 be formed of a sheet metal plate 66. Haas also does not suggest any need for the availability of shoes in different widths, and the Haas window design does not propose any different widths of jamb shoe channels. Haas also suggests only a single extension spring connected to a sash shoe. A person of ordinary skill in the art reading the Haas disclosure at face value would receive no suggestion for any need of variable width shoes, any possibility of extruding shoes, forming extruded shoes of different widths, or any need that shoes have different widths or connect to different numbers of counterbalance elements.

Claim 51 distinguishes from Haas because Haas does not suggest extrusion of sash support arms or that sash support arms be made in different lengths. The Haas structure does not require sash support arms of different lengths and proposes sash support arms with blind bores that are not extrudable. A person of ordinary skill in the art upon reading the Haas disclosure would receive no suggestion for these claimed characteristics.

Claims 64-66 require that sash shoes and locking hooks each be formed of metal extrusions, that the shoes have extrusion-formed grooves that receive pivot pins supporting the locking hooks (claim 65), and that the shoes have extrusion-formed slots that retain resilient latches for holding the locking hooks in latched positions (claim 66). Haas does not anticipate any of these features, because Haas does not suggest extrusion of either shoes or locking hooks and does not propose configurations of shoes or locking hooks that are extrudable. Instead, Haas proposes shoes formed of sheet metal plates 66 without any extrusion-formed grooves to receive pivot pins or slots to retain resilient latches. Pivot pins for Haas shoe locks are mounted in transverse bores in shoes 64; and Haas does not suggest any form of resilient latches for holding locking hooks in latched positions, since Haas' locking hooks are constantly biased toward locking engagement with window jambs.

A person of ordinary skill in the art upon reading the Haas disclosure would receive no suggestion that either shoes or locking

hooks can be extruded and instead would have contrary suggestions for configurations requiring transverse bores and sheet metal shapes that are not extrudable. Such a person would also receive no suggestion from Haas for extrusion forming of grooves for pivot pins or slots to retain resilient lock latches, since Haas to the contrary suggests bores for pivot pins and does not suggest any resilient lock latches mounted in any manner on shoes.

5. Whether claims 12-25 are unpatentable under 35 USC 103(a) as being obvious over Osten.

Claims 12-25 require sash shoes formed of a metal extrusion having a predetermined profile extending evenly for a width of the shoes and establishing an elevational configuration of the shoes. These claims also require that the elevational configuration extend integrally between a hook-shaped upper region formed to interconnnect with a counterbalance element and an L-shaped lower region forming a platform extending toward the sash from vertically below the upper region.

Osten does not suggest these features. Osten mentions extrusion only as a way of forming window jambs and does not suggest extrusion as a way of forming sash shoes. There is no elevational configuration of an extrusion profile that can form the Osten sash shoes, which require a central recess transverse to such an elevational configuration to receive locking plate 92. The Osten shoe configuration contradicts the possibility of extrusion as a way of forming the Osten shoes.

The Osten shoes also lack a hook-shaped upper region formed to connect with a counterbalance element. Osten suggests connecting a counterbalance element to locking plate 92, rather than to a shoe supporting locking plate 92. Nothing about the Osten proposal for a sash connection would suggest a hook-shaped upper shoe region formed by an extruded elevational profile.

The Osten shoes also fail to suggest an L-shaped lower region forming a platform extending toward a sash from vertically below the hook-shaped upper region. The Osten shoes have no L-shape; and the only sash-supporting platform suggested by Osten is a surface of locking plate 92, which is a separate element pivotally mounted on a carrier shoe and therefore not extrudable. A person of ordinary skill in the art upon reading the Osten disclosure would receive no suggestion for forming a shoe in an L-shaped configuration, supporting a sash on an L-shaped shoe platform, forming such an L-shape by extrusion of a shoe, giving an extruded shoe a hook-shaped upper region, or forming a shoe of a width of an extruded configuration.

Claims 13-15 further distinguish from Osten for the additional reason that they require sash support arms formed of an evenly extending profile of a metal extrusion. Osten does not suggest extrusion for sash support arms 50; nor does Osten suggest sash support arms in a configuration that is extrudable. Arms 50 require blind bores for receiving springs 56, and these contradict any possibility of extruding sash support arms 50.

Osten also does not suggest that the outwardly extending positions of sash support arms be located vertically below a connection to a counterbalance element (claim 14), because Osten to the contrary suggests a lateral offset between the sash support arms and the counterbalance element. Osten also does not suggest that sash support arms hang downwardly when not supporting the sash (claim 15), because Osten suggests to the contrary that sash support arms be constantly biased outward by springs 56.

Claims 16-18 further distinguish from Osten for the additional reason that they require locking elements that engage jamb projections to lock the shoes. Osten does not suggest any jamb projections for locking or other purposes and, to the contrary, suggests smooth jamb walls against which locking plate 92 locks by virtue of biting edge 98. A person of ordinary skill in the art upon reading the Osten disclosure would not receive any suggestion for forming projections on jambs to engage locking elements, or that

locking elements be formed of metal extrusions (claim 17), or that locking elements be formed as hooks that catch on jamb projections (claim 18).

Claims 19-21 further distinguish from Osten for the additional reason that they require a mid-region of an extruded shoe to be formed to support a guide that slides in a jamb to guide vertical movement of the shoe. Instead, Osten suggests shoes formed with vertical surfaces extending from top to bottom of the shoes to guide on jamb walls. This teaches against the claimed arrangement of an extruded support for a mid-region guide, or an extruded retaining groove for such a guide (claim 20). Osten also does not suggest an extruded latch-retaining groove for a hook latch or a pin groove for a shoe lock (claim 21). Osten does not propose any such hook latch at all; and for a lock pivot pin, Osten suggests instead a bore or hole that is not a groove and is not extrudable.

Claims 22 and 23 further distinguish from Osten for the additional reason that they suggest variable lengths of a shoe extrusion to form shoes of different widths fitting different sizes of jamb channels. Since Osten does not suggest extrusion of a shoe, nothing about Osten suggests the possibility of a shoe extrusion being formed in different widths. Nor does Osten suggest connection of different numbers of counterbalance elements to shoes of different widths (claim 23).

Claims 24 and 25 further distinguish from Osten for the additional reason that Osten does not suggest sash support arms formed of extrusions or sash support arms having configurations that are extrudable, since Osten proposes sash support arms with unextrudable blind bores to receive compression springs 56. Osten also does not suggest or present any need for sash support arms of different lengths. Nor does the Osten disclosure contain any hint of the possibility of different distances for sash support arms to span between opposite shoes. Since a person of ordinary skill in the art can receive no suggestion from Osten for sash support arms of different lengths, such a person can also get no hint from Osten that

sash support arms be extruded with code lines indicating size (claim 25).

6. Whether claims 35-38 and 45 are unpatentable under 35 USC 103(a) as being obvious over Haas as applied to claims 1-11, 29, 30, 32-34, 39-44, 46-48 and 61-63, 53-58, 60, 67-73, and in further view of Osten.

Claims 35 and 36, besides incorporating the unanticipated body of claim 29 requiring that sash shoes be extruded, are also not obvious from Haas in view of Osten. Haas proposes shoe guide pins 82 and 84, but does not suggest that a shoe can be extruded to meet all the requirements of claim 29 or that such an extrusion can be configured to mount the claimed guide or to form with a mid-region interlock to hold such a guide (claim 36). The Haas guide pins 82 and 84 are not mounted on an extruded shoe, but are housed in bores in a sheet metal plate 66. Osten also does not suggest extrusion for a sash shoe and instead suggests a shoe configuration that is not extrudable. Furthermore, instead of suggesting a mid-region shoe guide as claimed, Osten suggests that entire vertical surfaces of a molded shoe be formed to guide on window jambs. No combination of these references can suggest extrusion as a way of forming a shoe or an extrusion accommodating a mid-region guide for the shoe.

Claims 37 and 38, besides incorporating the unanticipated body of claim 29, are not obvious from Haas in view of Osten. These claims require that extruded shoes be available in different widths set by different predetermined lengths of an extrusion meeting the requirements of claim 29. Neither Haas nor Osten suggests extrusion as a possibility for forming a sash shoe, and each suggests a shoe configuration that departs from the claim requirements of an integral hook shape and support platform shape.

The teaching of each of these references is contrary to extrusion, since Haas proposes that a shoe be formed of a sheet

metal plate that does not integrate any hook and sash support platform and Osten teaches a molded shoe with a transverse central recess that is not extrudable. A person of ordinary skill in the art, upon reading these references, would receive no suggestion that shoes be formed of different widths of an extrusion or even that different widths of shoes are necessary for different sizes of jamb channels. Moreover, neither reference suggests connection of different numbers of counterbalance elements to a single shoe (claim 38).

Claim 45, besides incorporating the unanticipated body of claim 39, defines an extruded metal shoe configuration that accommodates a resin guide. Although Haas suggests guide pins 82 and 84, Haas does not suggest any resin guide combined with an extruded metal shoe configuration. Instead, Haas suggests that a shoe be formed of a sheet metal plate 66. Haas also does not suggest a shoe integrally forming a sash support platform, since platform 112 is pivotally mounted on shoe plate 66. Moreover, Haas does not suggest sash support arms pivotally connected to a stile of a sash, because Haas' sash support arms slide horizontally in sash pockets and do not pivot.

Although Osten suggests sash support arms that can pivot, Osten does not suggest that these be extruded or that a shoe be extruded. Osten does not suggest any resin guide mounted on a shoe; and to the contrary, Osten suggests a shoe body formed with vertical guide surfaces that extend from top to bottom of a shoe. The configurations that Osten proposes for a shoe and sash support arm are not extrudable, because of a transverse recess suggested for a shoe and a blind bore suggested for a support arm. Altogether, a person of ordinary skill upon reading the disclosures of Haas and Osten would have no suggestion for combining a resin guide with an extruded shoe and support arms meeting the requirements of claim 39.

7. Whether claims 59 and 72 are unpatentable under 35 USC 103(a) as being obvious over Osten.

Claims 59 and 72 require plural support arm extrusions having different lengths identified by extruded coding lines. Osten does not suggest extrusion for support arms or that support arms have different lengths. Osten's window configuration does not require support arms of different lengths, and Osten's proposal for sash support arms having transverse blind bores to receive compression springs 56 makes such sash support arms not extrudable. A person of ordinary skill in the art upon reading the Osten disclosure would receive no suggestion that sash support arms be extruded, would receive instead a suggestion for support arm configurations that are not extrudable, would receive no suggestion for support arms of different lengths, and would receive no suggestion that different extruded lengths of support arms be provided with extruded coding lines.

8. Whether claim 52 is unpatentable under 35 USC 103(a) as being obvious over Haas as applied to claims 31, 49-51, and 64-66.

Claim 52 requires that different extrusions of sash support arms be formed with evenly extending code lines indicating different arm lengths. Haas suggests sash support arms 152 that are not formed as extrusions and that include blind bores receiving compression springs 164 and are therefore not extrudable. Haas does not suggest sash support arms of different lengths, and Haas' sliding arrangement of sash support arms 152 does not require that they have different lengths. Haas also does not suggest that different lengths of support arms be extruded with evenly extending code lines indicating different lengths. A person of ordinary skill in the art upon reading the Haas disclosure would receive no suggestion for different lengths of support arms, any need for coding the different lengths of support arms, any suggestion that support arms can be extruded, or any suggestion that extrusions forming different

lengths of support arms can also form extruded code lines identifying different lengths. To the contrary, Haas teaches against an extrudable configuration for a support arm and any need for different lengths of support arms.

9. Appendix

The claims involved in this appeal are as follows:

1. A system supporting a sash that is laterally removable from between opposed window jambs, the system comprising:

a. a pair of sash support arms mounted to hang freely downward on respective opposite stiles of the sash and to pivot from downwardly hanging positions to outwardly extended positions that the support arms assume when supporting the sash;

b. the sash support arms in the downwardly hanging positions being disposed so that as the sash is lowered toward a supported position, the downwardly hanging arms engage sash supporting platforms of counterbalanced sash shoes locked into the jambs so that sash-lowering engagement between the arms and the platforms pivots the arms outward along the platforms; and

c. outer end regions of the sash support arms in the outwardly extended positions resting on regions of the platforms spaced from the sash and arranged vertically under counterbalance elements connected to the shoes to support the weight of the sash.

2. The system of claim 1 wherein the sash supporting platforms of the shoes extend toward the sash stiles so that inner regions of the platforms engage the sash support arms in the downwardly hanging positions and so that outer regions of the platforms engage the outer end regions of the sash support arms in the outwardly extended positions.

3. The system of claim 2 wherein the counterbalance elements are connected to the shoes in regions vertically above the outer platform regions.

4. The system of claim 1 wherein the shoes include locking elements deployable to lock the shoes to jamb projections during removal and replacement of the sash.

5. The system of claim 4 wherein the locking elements are pivotally mounted on the shoes and latched in undeployed positions out of engagement with window jambs.

6. The system of claim 4 wherein the locking elements are formed as extruded metal hooks.

7. The system of claim 1 wherein the shoes and the sash support arms are each formed of metal extrusions having evenly extending profiles.

8. The system of claim 7 wherein the shoes are available in different widths formed as different predetermined lengths of the shoe extrusion so that different widths of shoes fit different widths of jamb channels.

9. The system of claim 8 wherein shoes of different widths are adapted to connect to different numbers of counterbalance elements.

10. The system of claim 7 wherein the extrusions for the sash support arms are available in different lengths to fit different jamb dimensions.

11. The system of claim 10 wherein the different length sash support arms have extruded code lines indicating size.

12. In a system counterbalancing a window sash supported by a pair of counterbalanced sash shoes so that the sash extends between a pair of jambs from which the sash is removable by maneuvering the sash upward and laterally while the shoes are locked in the jambs, the improvement comprising:

a. the shoes being formed of a metal extrusion having a predetermined profile extending evenly for a width of the shoes and establishing an elevational configuration of the shoes; and

b. the elevational configuration extending integrally between a hook-shaped upper region formed to interconnect with a counterbalance element and an L-shaped lower region forming a platform extending toward the sash from vertically below the upper region.

13. The improvement of claim 12 wherein the sash is supported on the shoes by sash support arms formed of a metal extrusion having an evenly extending profile.

14. The improvement of claim 13 wherein the sash support arms are movably mounted on the sash to rest on the shoes in outwardly extending positions of the sash support arms located vertically below the upper region interconnected with the counterbalance elements.

15. The improvement of claim 13 wherein the sash support arms are mounted on the sash to pivot between outwardly extending positions supporting the sash and downwardly hanging positions that the support arms assume when not supporting the sash.

16. The improvement of claim 12 wherein the shoes include locking elements that engage jamb projections to lock the shoes during sash removal and replacement.

17. The improvement of claim 16 wherein the locking elements are formed of a metal extrusion and are pivotally mounted on the shoes.

18. The improvement of claim 16 wherein the locking elements are formed as hooks that catch on the jamb projections and the shoes have latches that latch the locking elements in undeployed positions out of engagement with window jambs.

19. The improvement of claim 12 wherein the elevational configuration of a mid-region of the shoe is formed to support a guide that slides in a jamb to guide vertical movement of the shoe.

20. The improvement of claim 19 wherein the profile configures a guide retaining groove that receives the guide.

21. The improvement of claim 20 wherein the profile configures a latch retaining groove for receiving a hook latch and a pin groove for receiving a pivot pin of the shoe hook.

22. The improvement of claim 12 wherein the shoes are formed of predeterminedly variable lengths of the extrusion to form shoes of different widths fitting different sizes of jamb channels.

23. The improvement of claim 22 wherein shoes of different widths have upper regions adapted to interconnect to different numbers of counterbalance elements.

24. The improvement of claim 13 wherein different metal extrusions having different evenly extending profile lengths form sash support arms available in different lengths to accommodate different distances between opposite shoes.

25. The improvement of claim 24 wherein the different lengths of sash support arms have extruded code lines indicating size.

29. A counterbalance sash shoe comprising:

a. a metal extrusion having a predetermined, evenly extending profile establishing an elevational configuration of the shoe;

b. the elevational configuration extending integrally downward from an upper region of the shoe formed in a hook shape to interconnect with a counterbalance to a lower region of the shoe formed as a platform to support a sash; and

c. the shoe having a width established by a predetermined length of the extrusion.

30. The shoe of claim 29 including a locking hook mounted on the shoe and deployable to an operative position in which the hook hangs downward from the shoe.

31. The shoe of claim 30 wherein the hook is formed of a metal extrusion having an evenly extending profile.

32. The shoe of claim 30 including a spring latch for retaining the hook in an inoperative position in which the hook does not hang downward from the shoe.

33. The shoe of claim 32 wherein the hook is manually movable to a latched engagement with the spring latch and is unlatched from the spring latch by pressing between ends of the hook and the spring latch.

34. The shoe of claim 30 wherein the profile configures a pin groove for receiving a pin for pivoting the hook and a spring groove for retaining the spring latch.

35. The shoe of claim 29 including a guide mounted on the shoe between the platform and the upper region, the guide being formed of resin material.

36. The shoe of claim 35 wherein the profile configures a mid-region of the shoe to have an interlock for holding the guide.

37. The shoe of claim 29 wherein the shoe is available in different widths set by different predetermined lengths of the extrusion to fit different sizes of jamb channels.

38. The shoe of claim 37 wherein the upper regions of shoes of different widths are adapted to connect to different numbers of counterbalance elements.

39. A sash support system comprising:

a. a plurality of sash support elements each formed of a metal extrusion having an evenly extending profile establishing an elevational configuration of the element;

b. the elevational configuration of a first one of the extruded elements integrally forming a shoe having a hook-shaped upper region engaging a counterbalance and a platform-shaped lower region supporting a sash; and

c. the elevational configuration of a second one of the extruded elements integrally forming a sash support arm pivotally connected to a stile of the sash to engage the sash supporting region of the shoe.

40. The system of claim 39 wherein the elevational configuration of a third one of the extruded elements forms a shoe lock connected to the lower region of the shoe to be movable between deployed and undeployed positions.

41. The system of claim 40 wherein the shoe profile configures a pin groove for receiving a pivot pin supporting the shoe lock.

42. The system of claim 40 including a resilient latch mounted on the shoe for retaining the shoe lock in the undeployed position.

43. The system of claim 42 wherein the shoe lock and the latch are configured so that the shoe lock is manually latchable and unlatchable.

44. The system of claim 40 wherein the shoe lock is pivotally movable between the deployed and undeployed positions and is downwardly dependent from the shoe in the deployed position.

45. The system of claim 39 including a resin guide mounted on the shoe.

46. The system of claim 45 wherein the elevational configuration of a mid-region of the shoe is formed with a locking slot for receiving the resin guide.

47. The system of claim 39 wherein the sash support arm is pivotally mounted on the sash stile to move between an outwardly extending position supporting the sash and a downwardly hanging position that the support arm assumes when not supporting the sash.

48. The system of claim 47 wherein the sash support arm braces against a mounting bracket limiting movement of the sash support arm beyond the outwardly extending and downwardly hanging positions.

49. The system of claim 39 wherein the shoe is available in different widths established by different predetermined lengths of the first extruded element to accommodate different widths of jamb shoe channels.

50. The system of claim 49 wherein upper regions of different shoe widths are adapted for connecting to different numbers of counterbalance elements.

51. The system of claim 39 wherein the sash support arm is available from a plurality of extrusions having different evenly extending profiles establishing different lengths for the support arm.

52. The system of claim 51 wherein the plurality of extrusions for the sash support arm are formed with evenly extending code lines indicating different arm lengths.

53. A sash support comprising:

a. sash support arms movably mounted respectively on each stile of a sash so that the support arms hang downward in dependent positions when not supporting the sash and move outward to braced positions in response to engagement of the support arms with locked sash shoes as the sash is lowered between the shoes so that the weight of the lowered sash urges the sash support arms outward on the shoes to the braced positions; and

b. the support arms in the braced positions having end regions resting on respective sash shoes in support regions vertically under upper shoe regions where counterbalance elements are connected to the sash shoes.

54. The support of claim 53 wherein mounting brackets pivotally mount the support arms on the sash stiles and limit movement of the support arms beyond the downwardly hanging and braced positions.

55. The support of claim 60 wherein the profile of the extrusion for the shoes forms the upper regions connected to counterbalance elements vertically above support regions engaging end regions of the braced support arms.

56. The support of claim 55 wherein the support regions of the shoes extend toward the sash stiles to engage the support arms in their downwardly hanging positions when the sash is lowered into engagement with the shoes.

57. The support of claim 56 wherein the support arms move from their downwardly hanging positions to their outward braced positions by sliding along the support regions of the shoes as the sash is lowered.

58. The support of claim 53 wherein the sash support arms are formed of a metal extrusion having an evenly extending profile.

59. The support of claim 58 wherein a plurality of extrusions for the support arms have different evenly extending profiles establishing different arm lengths and are provided with extruded coding lines indicating support arm length.

60. The support of claim 53 wherein the shoes are formed of a metal extrusion having an evenly extending profile.

61. A system locking counterbalance shoes to window jambs while a sash supported on the shoes is removed from between the window jambs, the system comprising:

a. the shoes having hooks that are pivotally mounted on lower regions of the shoes to move between latched and unlatched positions;

b. the hooks in unlatched positions hanging dependently downward from the shoes to engage the jambs and hook under lances formed in the jambs as the shoes rise; and

c. the hooks in latched positions being retained out of engagement with the jambs and clear of the lances.

62. The system of claim 61 wherein resilient latches are carried on the shoes for holding the hooks in the latched positions.

63. The system of claim 62 wherein the hooks are manually movable into the latched positions and are released from the latched positions by pressing between ends of the hook and the latch.

64. The system of claim 61 wherein the hooks and the shoes are each formed of metal extrusions having evenly extending profiles.

65. The system of claim 64 wherein the shoes have extrusion-formed grooves that receive pivot pins supporting the hooks.

66. The system of claim 65 wherein the shoes have extrusion-formed slots that retain resilient latches for holding the hooks in the latched positions.

67. A system supporting a sash that is laterally removable from between opposed window jambs and is supported on counterbalanced shoes that run vertically within the jambs and are separated sufficiently to allow lateral movement of the sash, the system comprising:

a. the shoes having platforms that extend toward the sash to support the sash;

b. the sash having a support arm secured to each sash stile so that the sash support arms hang downward in positions in which lower ends of the support arms engage sash end regions of the shoe platforms when the sash and the support arms are moved downward from above the shoe platforms;

c. the sash support arms being mounted on the sash to pivot between the downwardly hanging positions and outwardly extending positions in which the sash support arms engage jamb end regions of the shoe platforms as weight of the downwardly moved sash transfers to the shoes via the support arms; and

d. counterbalance elements exerting a lifting force on the shoes in regions vertically above the jamb end regions of the shoe platforms engaged by the sash support arms in the outwardly extending positions.

68. The system of claim 67 wherein the shoe platforms are configured with steps that the ends of the support arms slide downward over as the support arms move from the sash end regions to the jamb end regions of the shoe platforms.

69. The system of claim 67 wherein the sash support arms are braced against movement beyond the downward hanging positions and the outwardly extending positions.

70. The system of claim 67 wherein the sash support arms are formed of a metal extrusion having an evenly extending profile.

71. The system of claim 70 wherein the extrusions are available in different profiles forming support arms of different lengths to accommodate the sash to different window dimensions.

72. The system of claim 71 wherein extrusions of different profiles are formed with coding lines to indicate the different lengths of the sash support arms.

73. The system of claim 67 wherein the shoes are formed of a metal extrusion having an evenly extending profile.

74. A system counterbalancing a laterally removable sash supported by counterbalanced sash shoes respectively running vertically in opposed jambs arranged along opposite stiles of the sash, the system comprising:

a. support arms extending between the sash and sash shoes biased upward at lifting regions spaced from each sash stile, the support arms being arranged for transferring the weight of the sash to the shoes at support regions vertically below the lifting regions to minimize any moment arms tending to turn the shoes around horizontal axes; and

b. the support arms moving to downwardly hanging positions upon movement of the sash upward and laterally from the shoes.

75. The system of claim 74 wherein the support arms are braced in support positions transferring the weight of the sash to the support regions of the shoes, and the support arms otherwise hang downward when not transferring sash weight to the shoes.

76. The system of claim 74 wherein the shoes are formed of a metal extrusion having an evenly extending profile.

77. The system of claim 74 wherein the sash support arms are formed of a metal extrusion having an evenly extending profile.

78. The system of claim 77 wherein the extrusions are available in different profiles forming support arms of different lengths to accommodate the sash to different window dimensions.

79. The system of claim 74 wherein the shoes have platforms extending from the support regions toward the sash to engage support arms hanging downward from a sash being lowered onto the shoes.

80. A system supporting a sash that runs vertically within an opposed pair of window jambs containing counterbalance sash shoes, the sash being movable laterally of the jambs for withdrawing the sash from between the jambs, and the system comprising:

a. a pair of movable support arms engaging the sash and the counterbalance shoes and arranged for transferring the weight of the sash to support regions of the counterbalance shoes;

b. the counterbalance shoes being biased upward at lifting regions arranged vertically above the support regions to minimize any moment arms tending to turn the shoes around horizontal axes; and

c. the support arms being moved in response to lifting the sash upwardly of the shoes in a region between the lifting regions when the sash is lifted to remove its weight from the support regions.

81. The system of claim 80 wherein the support arms move in response to being subjected and not subjected to sash weight.

82. The system of claim 80 wherein the shoes are formed of a metal extrusion having an evenly extending profile.

83. The system of claim 80 wherein the sash support arms are formed of a metal extrusion having an evenly extending profile.

84. The system of claim 83 wherein a plurality of extrusions are available in different lengths to form support arms that can bridge different distances between stiles of the sash and the support regions.

85. The system of claim 80 wherein the support arms move inwardly toward the sash when the sash is lifted from the shoes.

86. A system supporting a sash that is laterally removable from between opposed window jambs, the system including counterbalance shoes arranged within the jambs to be spaced laterally from stile edges of the sash to allow lateral movement of the sash for removing the sash from between the jambs, and the system comprising:

a. sash support arms arranged for bridging distances between the shoes and stiles of the sash, the support arms being movable between sash supporting positions in which the support arms transfer weight of the sash to the shoes and sash uplifted positions in which the support arms hang downward from the sash stiles and allow lateral movement of the sash between the shoes;

b. counterbalance lifting regions for the shoes being arranged vertically above support regions that uphold the weight of the sash transferred via the support arms to the shoes so that the sash weight does not subject the sash shoes to moment arms tending to turn the sash shoes about horizontal axes; and

c. the sash support arms in the support positions being braced against moving in response to sash weight.

87. The system of claim 86 wherein the shoes are formed of a metal extrusion having an evenly extending profile.

88. The system of claim 86 wherein the sash support arms are formed of a metal extrusion having an evenly extending profile.

89. The system of claim 88 wherein a plurality of extrusions are made in different lengths to bridge different distances between stiles of the sash and the support regions.

90. The system of claim 86 wherein the shoes have platforms extending upward and toward the sash from sash weight support regions engaged by the support arms.

For any question, the Examiner is invited to call applicants' attorney at the number listed below.

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